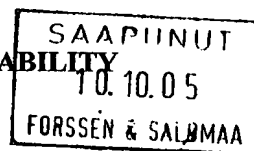


PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)



| | | |
|---|--|---|
| Applicant's or agent's file reference P7745PC00 | FOR FURTHER ACTION See Form PCT/IPEA/416 | |
| International application No. PCT/FI2004/000674 | International filing date (day/month/year) 12-11-2004 | Priority date (day/month/year) 17-11-2003 |
| International Patent Classification (IPC) or national classification and IPC H04B 1/69, H04L 27/00, H04B 1/38 | | |
| Applicant Nokia Corporation et al | | |
| 1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: <div style="margin-left: 20px;"> a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows: <div style="margin-left: 20px;"> <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. </div> </div> <div style="margin-left: 20px;"> b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). </div> | | |
| 4. This report contains indications relating to the following items: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application </div> | | |
| Date of submission of the demand 12-09-2005 | Date of completion of this report 03-10-2005 | |
| Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88 | Authorized officer Roger Bou Faisal /LR Telephone No. +46 8 782 25 00 | |

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI2004/000674

Box No. I Basis of the report

1. With regard to the language, this report is based on:



the international application in the language in which it was filed

a translation of the international application into _____,
which is the language of a translation furnished for the purposes of:

international search (Rules 12.3(a) and 23.1(b))



publication of the international application (Rule 12.4(a))



international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

the international application as originally filed/furnished



the description:

pages _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____



the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____



the drawings:

pages _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____



a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

the description, pages _____



the claims, Nos. _____



the drawings, sheets/figs _____

the sequence listing (*specify*): _____any table(s) related to the sequence listing (*specify*): _____4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages _____



the claims, Nos. _____



the drawings, sheets/figs _____

the sequence listing (*specify*): _____any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI2004/000674

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|-------------|-----|
| Novelty (N) | Claims | <u>1-20</u> | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | <u>1-20</u> | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | <u>1-20</u> | YES |
| | Claims | | NO |

2. Citations and explanations (Rule 70.7)

Currently proposals in the field suggest the pulse repetition frequency (PRF) to be fixed so that there exists a set of PRF values which can be selected for use in order to adjust the data rate. However, the problem with current proposals is that they do not appear to present an optimal way to adjust the PRF and the data rate. The PRF should be low enough to support maximum distance between a transmitting and a receiving device.

The object of the invention is to measure the link to obtain delay conditions and then adjust the PRF based on the measurements.

Documents cited in the international search report:

| | |
|-----------------------|-----------------------|
| D1: US 2003189975, A1 | D4: WO 0139451, A1 |
| D2: US 2003043934, A1 | D5: US 2002061081, A1 |
| D3: US 2003194979, A1 | |

Document D1 is considered to represent the closest prior art.

D1 relates to an impulse radio transceiver for full duplex ultra wide-band communications. The transceiver comprises an impulse radio transmitter that transmits impulse radio signal pulses, an impulse radio receiver that receives impulse radio signal pulses. Either or both of the impulse radio transmitter and the impulse radio receiver synchronizes the transmission and the reception of the impulse radio signal pulses for pulse interleaved communications. Pulse interleaving avoids self-interference between the transmitted impulse radio signal pulses and the received impulse radio signal pulses. In addition to pulse interleaved communications, bursts of pulses can be transmitted between two transceivers in an interleaved

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

fashion. Alternatively, two different pulse repetition rates are be used to transmit and receive impulse radio signal pulses simultaneously. Still further, selected pulses of the received or transmitted impulse radio signal pulses are blanked to avoid interference (abstract; paragraph [0144]-[0145]; and claims 1-20).

Independent claims 1, 8, 12 and 19

The invention according to independent claims 1, 8, 12 and 19 differs from D1 by the steps of measuring the link and by "dynamically" adjusting the PRF, which are steps not clearly mentioned in D1. The measuring of the link quality and adjusting the PRF are the main objects of the present invention.

It is mentioned in D1 that there is a possibility to operate at different repetition rates (paragraph [0015], claims 1-10).

D2 reveals a method and system for applying delay codes to pulse train signals. The delay codes vary the time offset between asynchronous pulse train signals to eliminate persistence of pulse coincidences. The pulse train signal may comprise a repeating pulse train. The delay codes specify delays between individual pulse trains or some number of pulse trains. The delay codes result in an averaging of pulse coincidences between the pulse train signals over time. Additionally, the delay codes may be generated using a pseudorandom code generation technique.

In D2 measurements of the link quality is performed.

D3 relates to a method for power control in an ultra wideband impulse radio system including: (a) transmitting an impulse radio signal from a first transceiver; (b) receiving the impulse radio signal at a second transceiver; (c) determining at least one performance measurement of the received impulse radio signal; and (d) controlling output power of at least one of the first transceiver and the second transceiver in accordance with the at least one performance measurement (abstract; paragraph [0139]-[0149]; and claims 1-15).

.../...

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

None of the documents D1, D2 and D3 mentions measurements for obtaining information of the delay conditions of the wireless link.

Therefore it would not have been obvious to adjust the pulse repetition frequency based on any such measurements.

Multipath propagation is a problem in UWB systems and the present invention provides a technical solution to this problem.

Accordingly, the invention defined in claims 1-20 is novel and is considered to involve an inventive step. The invention is industrial applicable.